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Virginia Marine Resource Bulletin

Virginia Sea Grant

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Winter 1-1-1983

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Virginia Sea Grant

Virginia Institute of Marine Science

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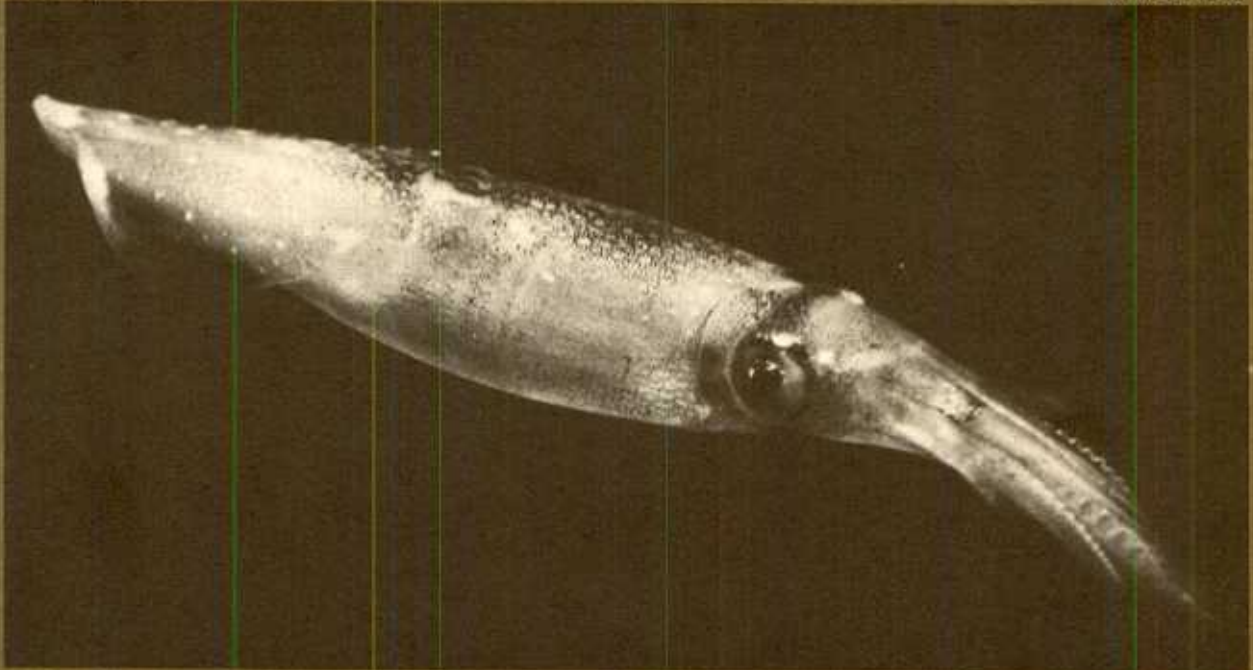


Marine  
Resource

# Bulletin

VOL. XV, NO. 1

WINTER 1983



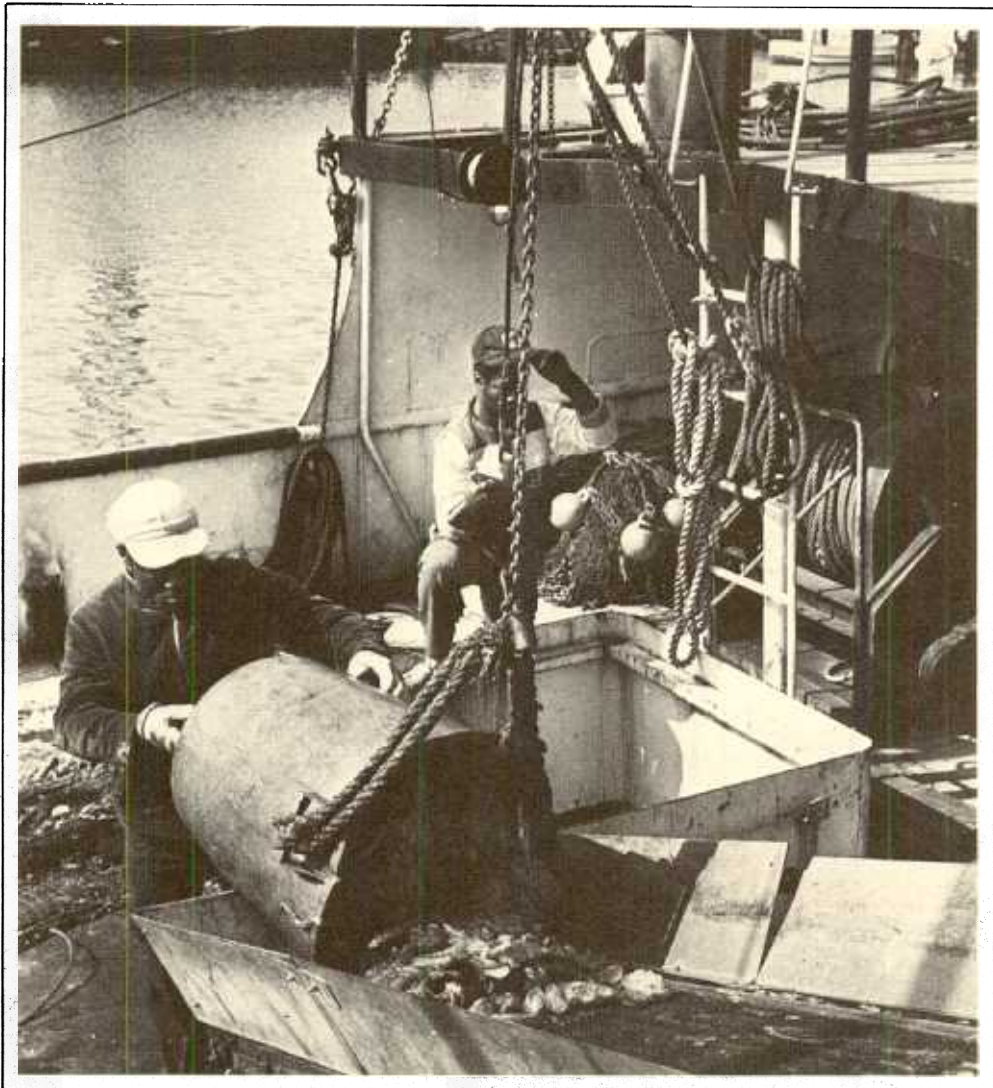
*Special squid issue -- an alternative fishery for Virginia  
squid recipes • Wavelets - super mollusk*

Virginia Sea Grant at VIMS/College of William & Mary



# SQUID

*A heavily iced catch of Loligo squid is transferred from vessel hold to conveyor belt at Mid-Atlantic Seafood Company in Newport News.*



Dick Cook

A marine animal just now receiving serious consideration as a highly marketable item by commercial fishermen in the United States is the squid. Long an "underutilized species" in fisheries management terms, the squid, a cephalopod, is represented by some 270 species in 25 families worldwide.

Squid come in many different sizes and shapes, with lengths ranging from less than an inch to more than 60 feet. Where East Coast fishermen are concerned, the two species gaining their attention are *Illex illecebrosus* (shortfinned squid) and *Loligo pealei* (longfinned squid).

Depending upon which country is doing the catching, these and similar squid may be utilized for either human consumption or as bait for other species such as tuna, blackcod and crab. Japan, the world's leading consumer of this seafood, uses squid for both purposes. In 1981 the Japanese consumed more than 500,000 metric tons (MT), a year when worldwide consumption was 900,000 MT. Spain, second to Japan in use of squid as



Dick Cook

*Emerging from a cold-water rinse, the squid are conveyed inside the processing plant where they will be packed and quick-frozen.*

food, came in a slow second with 75,000 MT that year. Remaining markets for squid as food in 1981 were Norway, Portugal, Italy, East Germany, Sweden, Bulgaria, Spanish Africa and the United States.

In Virginia, up until 1982, squid was treated mostly as a bycatch, with perhaps a few hundred pounds of *Loligo* trawled from continental shelf waters along with the primary catch of flounder and black sea bass. Virginia seafood companies were not set up to process squid, nor did they have established markets for squid products. Now things are starting to change, and Virginians, along with other East Coast commercial fishermen, are beginning to see the potential for both foreign and domestic marketing of this readily available seafood. Perhaps it was all those large foreign vessels fishing off both coasts of the U.S. each year that finally aroused American curiosity.

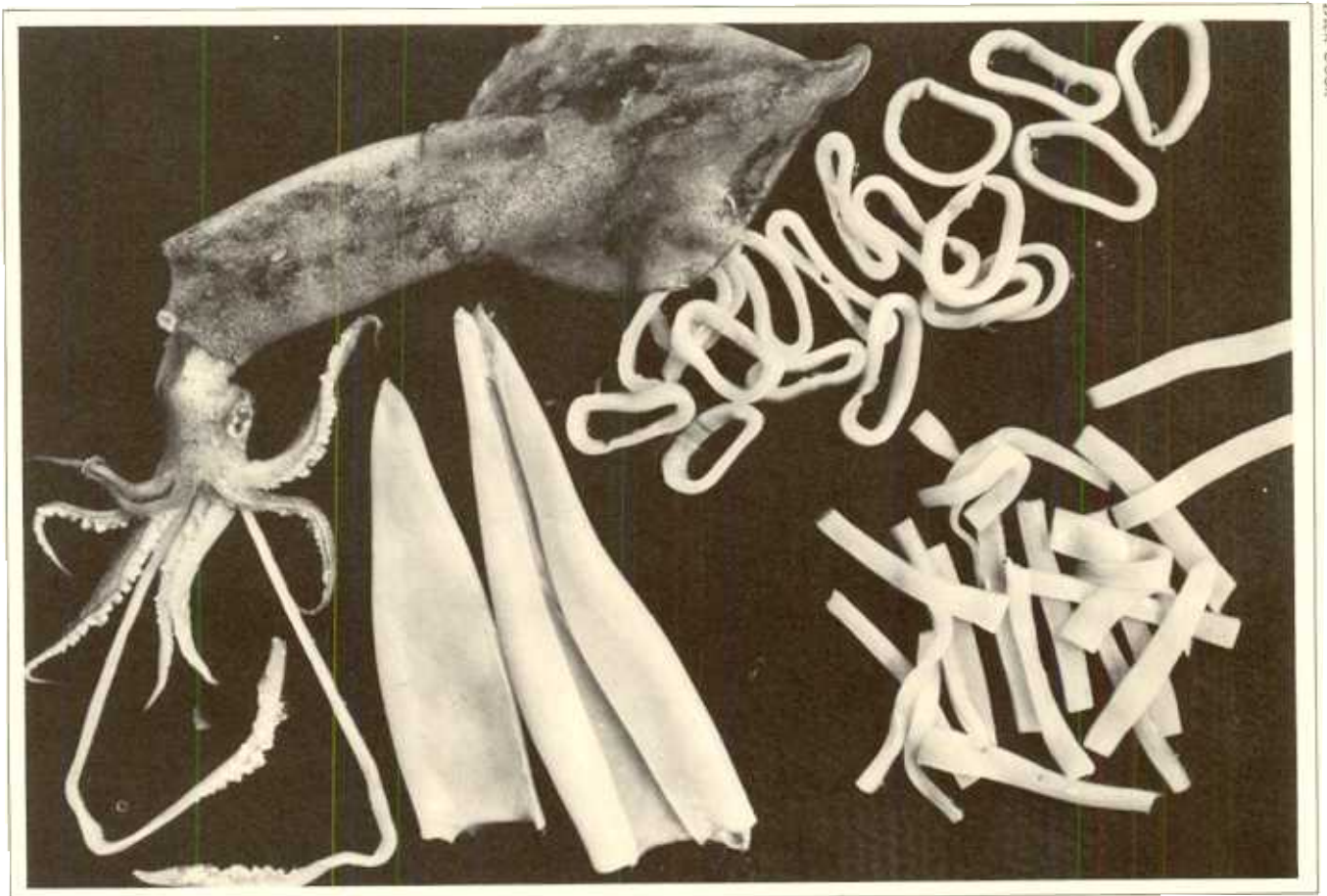
Historically, squid is not a seafood item with Americans, although several species important to the palates of other nations have been present within American jurisdictional waters. Foreign quotas for squid harvesting within our 200-mile fisheries conservation zone have always been gen-

erous enough to attract large processor/freezer ships from Japan and other squid consuming nations, especially in the last decade when traditional squid fishing grounds nearer Japan and Europe have experienced population declines.

So now American fishermen see a large, virtually untapped resource close to home, and are beginning to develop the technology, vessels and processing experience necessary for exploiting squid.

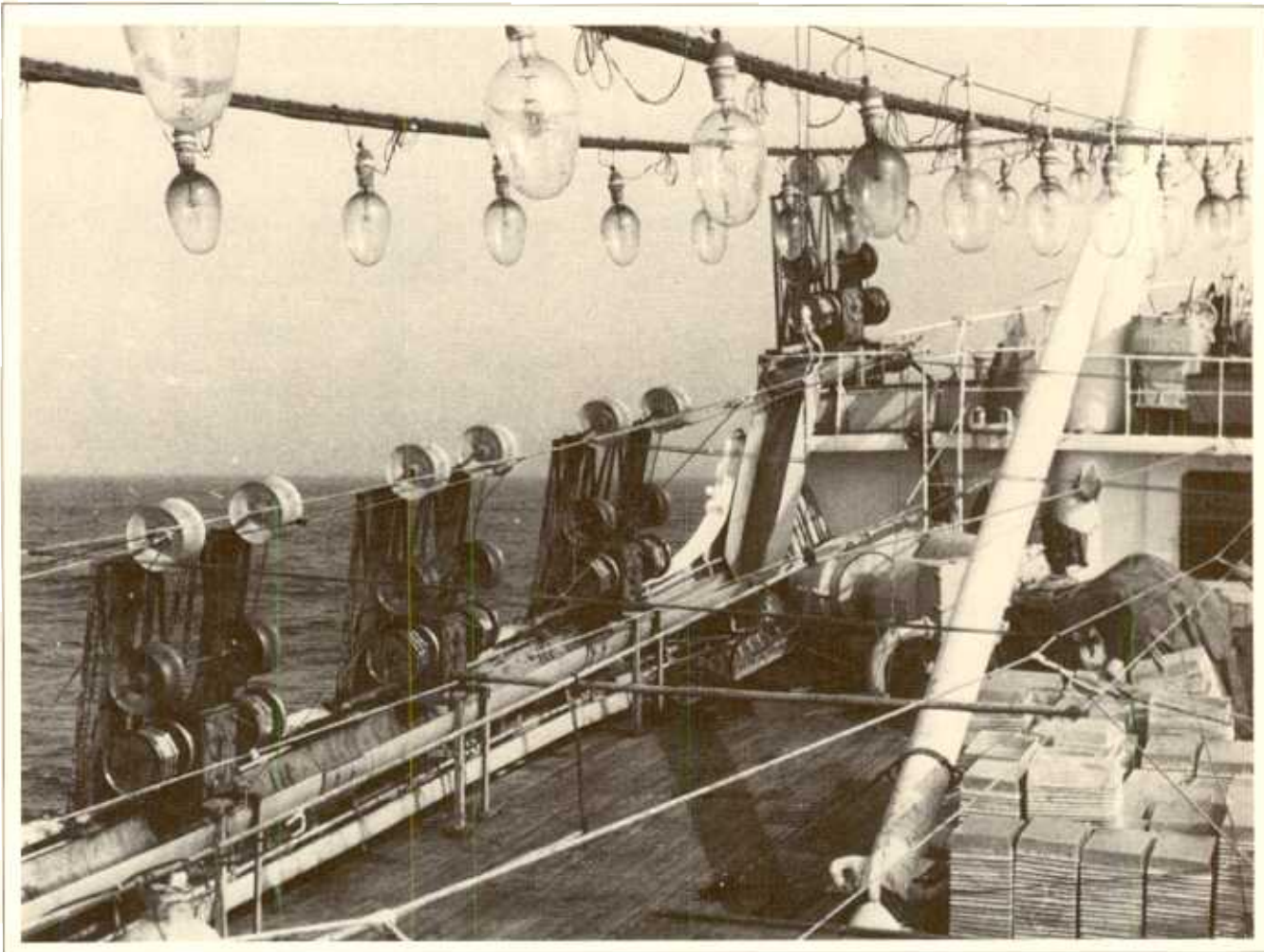
Lacking a bony skeleton and protective scales, the squid is a fragile creature compared to the fishes, crustaceans and mollusks U. S. fishermen are used to dealing with. Not only that, squid tend to spoil fast if not handled properly from the time of capture. What all this means is that you have to be set up to do more than just drop your load of trawled squid into a hold and dump on some crushed ice. That is, if you want to break into some of the foreign markets utilizing whole squid as food. At present, most foreign markets demand sea-frozen squid; about the only land-processed form of squid product they will accept is cleaned mantles or "tubes."

Most U. S. vessels do not have that sea-freezing



A typical long-finned squid (*Loligo pealei*) about 1 lb. in weight yields more edible protein than a finfish of comparable size. Shown clockwise from the whole squid are rings, strips, slit mantle and whole mantle. The arms and tentacles, cut off below the eyes, are excellent when chopped and deep-fried.





*A large Japanese jigging vessel sports an array of attractor lights and jigging machines. Stacked at lower right are metal pans for quick freezing whole squid aboard ship.*

capability. At the other end of the spectrum are the Japanese, a nation whose people have been aggressively fishing for and developing the technology for capturing and processing squid since 1945. At that time the Japanese squid fishery was conducted with small, wooden non-motorized boats. From 1945 to 1975 it grew to a fishery utilizing very large high seas vessels ranging between 100-300 gross weight tons (GWT).

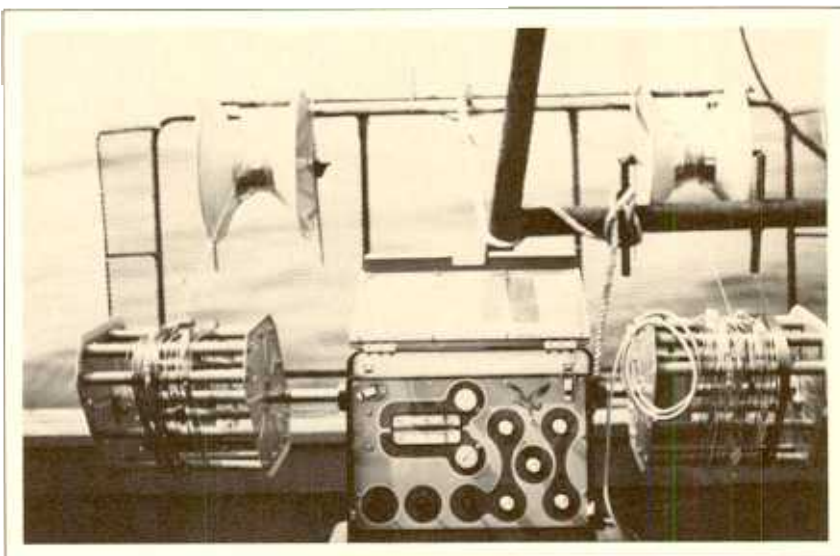
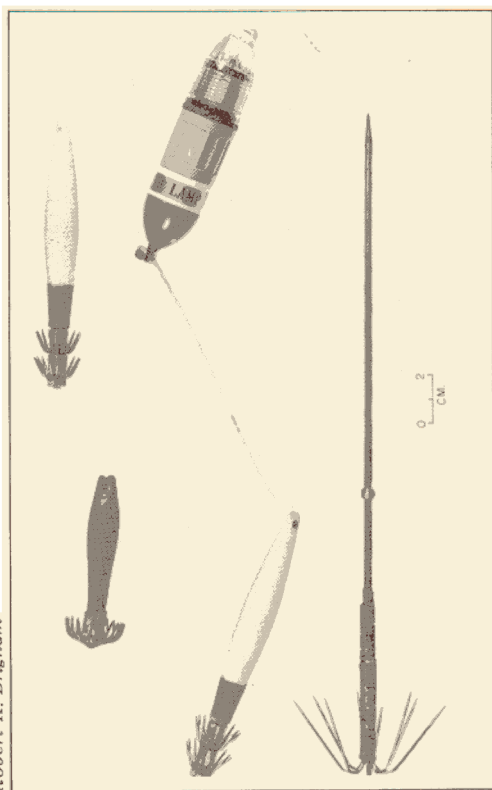
With the development of the squid jigging machine, the Japanese were able to land large quantities of squid using comparatively few crew members. Most important, squid caught by jigging came to represent the highest quality product on world markets, since they were immediately graded according to size and quickly frozen on board, without being subjected to crushing, bleaching by ice, or prolonged exposure to a nonrefrigerated environment. When methods other than jigging are used to capture squid, overall quality can be difficult to maintain.

The automatic jigging machine which revolutionized Japan's harvest method is a device where-

by an electric motor operates an axle which turns two hexagon-shaped spools. Jigs of assorted colors, sporting several rows of barbless hooks, are spaced about a meter apart along the monofilament line.

The squid attack the moving jigs, are hooked, and are carried aboard as the line winds on the spool, then are automatically dumped onto a screen. From there they are collected in baskets or are washed down a seawater trough to a sorting area. The squid are then either held in live storage or are immediately graded for size, boxed and quick frozen in 10 or 20 kg blocks, assuring the ultimate in freshness, uniformity and appearance. Squid frozen in this manner may be stored for up to six months.

A large vessel may employ a dozen or more two-spool jigging machines at one time, and the rate of catching can be regulated, by adding or subtracting machines from operation, to insure timely processing. Another advantage to jigging is that no other species, or "bycatch," is caught.



The latest in squid fishing technology is represented by this twin-spool automatic jigging machine. Relatively few crew members are needed for operation of jigging vessels.

Left, typical squid jigs, clockwise from top; lamp attached to Japanese jig, mid-Pacific jig, Japanese jig, Newfoundland jig and Japanese jig sans light.

Sonar is used to locate schools of pelagic squid such as *Illex* and *Loligo*, and moonless nights have been found best for jigging. Powerful lights are used to attract the squid to within 50 meters of the surface, although it is as yet unclear whether or not the lights actually attract the squid, or simply some small prey organism the squid are feeding upon. In any event, when conditions are right, a large quantity of squid can be landed in a relatively short period of time, with no broken ink sacs, torn skin or loss in color ... all important criteria in the foreign marketplace.

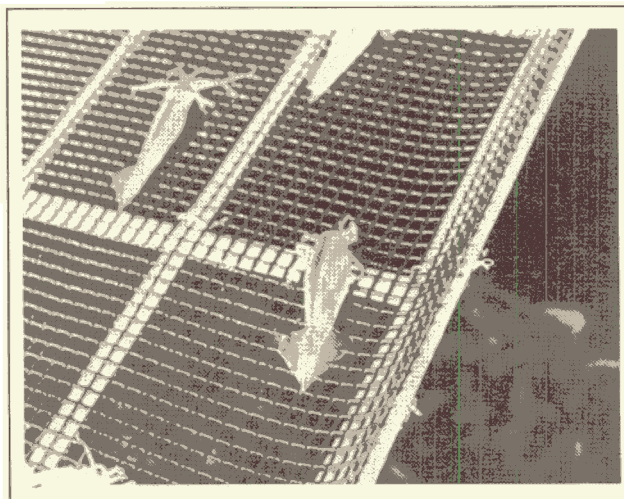
A second capture method for squid, and one most commonly employed by U. S. vessels, is trawling. This method of fishing is used on both the longfinned and shortfinned species during the daylight hours, when squid concentrate near the bottom. At night, bottom or near-bottom trawling has been found ineffective, due to the animals' migration pattern. The daily migration of squid seems to be vertical, say scientists; horizontal travel apparently is with the current. A combination of a sea anchor and a spanker sail has been found successful in keeping a jigging vessel with a school at a slow drift.

Off California, several other capture methods are used for what the fishermen term their "market squid," *Loligo opalescens*. In the Monterey area, the catch may be sucked up in hydraulic funnels or netted in power-assisted dip nets called brails, then pumped directly into the ship's hold.

The boats fish less than an hour's run from a shore-side processor.

The California fishery for another species, *Dosidicus gigas* (jumbo squid) is growing, primarily by Japanese and Mexican jigging vessels. This is the squid being harvested to the greatest extent in Mexican waters, and one that is the focal point of an intensive government-subsidized promotion program by Mexico, under the label "Grand Calamari."

*Illex* squid drop from the jigs onto a wire screen, then are conveyed by basket or water trough to a holding and sorting station below decks.





Almost all of the squid landed in California as late as 1981 were exported to southern Europe and Japan. Processed market squid products from California now include cleaned and skinned mantles and tentacles, stuffed squid, squidburgers, dried squid and smoked squid. Optimism is running high on the West Coast that squid, in its various processed forms, will be accepted by a growing domestic market. Most of the squid on the menus in American restaurants today is shipped from California.

Squid caught by Virginia fishermen are taken almost exclusively by trawlers. During the 1982 season for summer squid (*Illex*), John Holt of Mid Atlantic Seafood Company in Newport News, Virginia, reports that his company, (then Atlantic Shelf Fisheries) used two 90 ft. stern trawlers to take squid from New Jersey to North Carolina. Holt's skippers used a high rise rope net having a 5-ft. mesh in the wings to cut drag (squid can elude a slow-moving net by jetting out of the way). Most of Holt's catch last year was sold as bait to tuna longliners.



*Frozen squid arrive at a processing plant in Japan. Mantle size indicates they could be jumbo squid, found along the West Coast of the U.S. and harvested primarily by Japanese and Mexican jigging vessels.*

Another method of catching squid that has seen limited use in the northeast is the trap, similar to a fish trap. This stationary device depends upon the squid being abundant in the area for its success. The trap produces a quality squid, since the animals are held alive until transfer to boats.

Locating and catching squid is not that big a problem for America's commercial fishermen. However, since it is not considered a high money value item worldwide, and since squid are relatively abundant in the world's oceans, marketing them has presented problems in the past. There are several good reasons for this according to panelists at the International Squid Symposium, which convened in Boston, Massachusetts in August, 1981.

William Court, a speaker who presented a paper entitled "Japan's Squid Market," stated that "Over 30,000 boats fish squid (in Japan), and these range in size from one ton to over 500 tons, and are mostly jigging and gill net boats. In addition, many trawlers also harvest squid.

"The basic problems of the squid fisheries (in Japan) are the high and increasing cost of fuel, the low price of squid, intense competition due to an excessive number of boats, and the great price and supply fluctuations inherent in the fishery.

"When the squid supply is good from Japan's primary sources, imports are reduced with little concern for the effect on the foreign suppliers, even though those fisheries may have been developed and capitalized to meet Japan's market demand."

Most species of squid, including longfinned and shortfinned, have such a short life cycle (less than 2 years), that long range marketing plans based on a future fishery are virtually impossible. One cannot forecast a high or low demand in foreign squid markets even a year or two in advance.

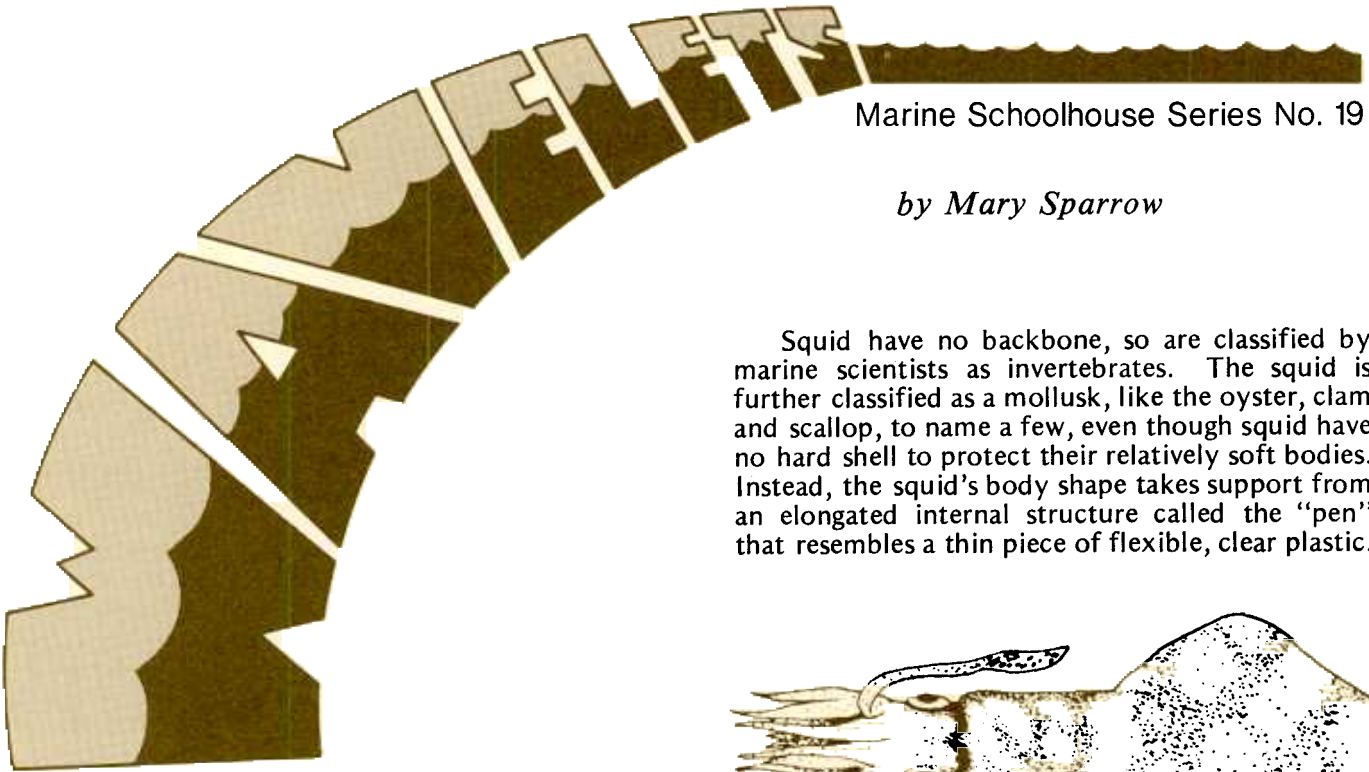
Newfoundland and Canadian fishermen have learned caution through experience in foreign squid marketing, and Americans, latecomers to the fishery, can profitably study the experiences of others.

This is not to say that the opportunity to export squid as food to Japan, Spain and other traditional markets does not exist for North Americans. There is a market, but an exporter will have to produce squid of the highest quality, hold operating costs to a minimum and possess a determined, flexible attitude, according to those who have tried.

The first criterion can be achieved only through dedication on the part of U. S. fishermen to market a squid that has been treated as a food

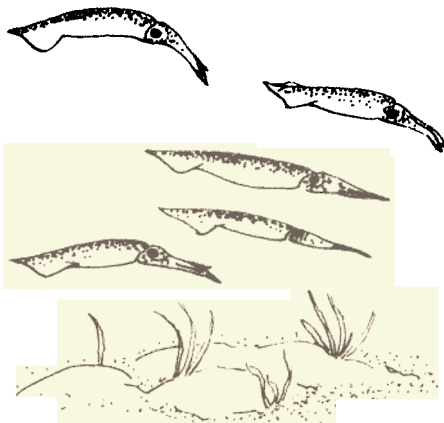
*Continued on Page 10*

by Mary Sparrow



# Squid: the Super Mollusk

“Rocket of the sea,” “magician of the ocean,” “super mollusk.” These are just a few of the phrases that have used to describe the squid, a unique marine animal distributed worldwide in the oceans and seas. Squid come in many sizes and shapes, with lengths varying from less than one inch to more than 60 feet.



Squid have no backbone, so are classified by marine scientists as invertebrates. The squid is further classified as a mollusk, like the oyster, clam and scallop, to name a few, even though squid have no hard shell to protect their relatively soft bodies. Instead, the squid's body shape takes support from an elongated internal structure called the “pen” that resembles a thin piece of flexible, clear plastic.



Long-finned squid

Like its relative the octopus, the squid has arms and tentacles. The number of arms a squid possesses, either 8 or 10, depends upon the species. The two species which live in Virginia's ocean water, *Loligo pealei* (longfinned squid) and *Illex illecebrosus* (shortfinned squid) have eight arms and two very long tentacles. The arms are used to grasp the prey after the tentacles, equipped with suction cups surrounded by small hooks, first make contact.

Squid are very fast swimmers, a characteristic which is helpful in escaping danger and catching food. All squid move in the same way --- by contracting muscles and jetting water through their bodies. The water taken into the mantle cavity of a squid is forced out of the mantle through a siphon. The force of the water shooting out of the siphon makes the squid move in the opposite direction from which the siphon is pointed. This is the way a jet plane moves; the gases are shot out in one direction, making the plane move in the other direction.

For this reason, the squid is sometimes called the “jet-propelled mollusk” and the “rocket of the sea.” The siphon is very flexible and can be pointed in any direction. This permits the squid to move forward or backward, up or down in the water column. Some squids have certain adapta-



tions which allow them to shoot out of the water and glide in the air for a short distance. Some reports state that squid have been seen leaping as high as twelve feet above the surface of the water.

Squid are carnivorous: They eat meat in the form of fish and small crustaceans, and are active and aggressive predators. When hunting something to eat, the squid slowly approaches its chosen prey, getting in close range. Then it quickly ejects water from its siphon, overtaking the prey and catching it with outstretched tentacles. The squid's arms then wrap around the prey and draw it up to the hard, parrot-like beak to be eaten, bite by bite. Since



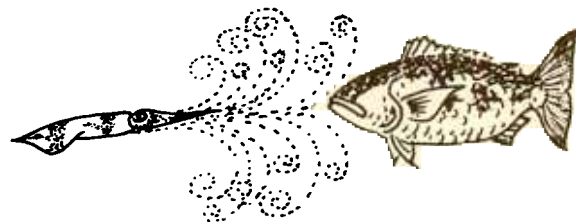
squid do not have great smelling or hearing abilities, it is believed that they recognize prey by sight.

Squid are eaten, in turn, by such predators as birds, fish, eels, sperm whales and humans. The squid's quickness helps protect them from most predators, but they also have other defense devices. Squid can change color, a trick useful both in distracting enemies and attracting mates. They may also change color for camouflage purposes, and to communicate among themselves.

As a last resort when faced by an attacker, a squid can release a confusing "smoke screen" of inky liquid in which it can hide. Predators that come in contact with the ink cloud sometimes



Short-finned squid attacking jig



appear to be confused for some time afterwards, thus permitting the squid to get away. The squid truly is a magician, seemingly able to disappear at will!

The major markets for squid as seafood are in Europe and Japan, where it is considered a delicious food. Lately, more and more Americans have been eating squid, surprised to find it is both tasty and nutritious. Until recently, we Americans sold most of our squid for bait. Now that may be changing. Seafood houses in the United States are just beginning to be equipped to process squid for human food, so be on the lookout for it in places where fish and fish products are sold.

Scientists are studying many aspects of the squid's ability to learn and remember (memory),



Dried beak of long-finned squid  
3X

and how its tentacles are used for touching and identifying different objects. Some researchers think a squid may be able to tell when an object is by its feel or texture. Probably the most interesting research being done with squid right now concerns studies about its vision. The eyes of the squid are very similar to the eyes of humans, as far as the physical structure is concerned.

The squid, as you know by now, is both interesting and of great potential value to man. All of us --- not only scientists and fisherman --- can profit by learning more about these fascinating creatures of the sea.

If you are interested in finding out more about squid, check with your school and local library. You may also obtain directions for dissecting a squid from: VIMS, Marine Education Section, Gloucester Point, VA 23062. ◆◆◆

## Squid



Long a staple seafood in Japan and southern Europe, squid is now catching the attention of American seafood consumers. Squid is high in protein and phosphorus, and contains traces of calcium, thiamin and riboflavin. Look for it in fresh or frozen form, or as a frozen breaded product. The following recipes are just a sampling of the many delicious ways to prepare this excellent seafood.

### BAKED STUFFED SQUID

2 Pounds whole squid, fresh or frozen (approximately 8 medium or 14 small squid)  
 2/3 cup partially cooked rice  
 1/2 cup finely chopped onion  
 1/4 cup chopped green pepper  
 1/4 cup chopped parsley  
 1/4 cup chopped linguica (Portuguese sausage)  
 1/2 tsp. salt  
 1/4 tsp. garlic salt  
 1/8 tsp. pepper  
 Chopped tentacles  
 1 can (1 lb.) tomatoes  
 3/4 cup white wine  
 1/2 cup chopped onion  
 1 T. flour  
 1 tsp. salt  
 1/8 tsp. pepper  
 1/8 tsp. liquid hot pepper sauce  
 1 clove garlic, crushed

*Clean squid, leaving washed mantles intact. Chop tentacles for stuffing.*

*Combine rice, onion, green pepper, parsley, linguica, garlic salt, salt, pepper and tentacles. Makes approximately 2 cups stuffing. Stuff squid loosely. Close opening with small skewer or toothpick.*

*Combine remaining ingredients and place in a well-greased baking dish, approximately 12 by 8 by 2 inches. Place squid in a single layer over the tomato mixture and cover with aluminum foil. Bake in a moderate oven, 375°F, for 30 minutes. Then remove foil and bake uncovered at 300°F for an additional 30 minutes. Makes 3 to 4 servings.*

### FRIED SQUID, GREEK STYLE

2 Pounds whole squid, fresh or frozen  
 2 T. lemon juice  
 1 tsp. salt  
 1/8 tsp. white pepper  
 1 egg, beaten  
 2 T. milk  
 1 cup flour  
 Fat for frying

*Clean squid, cutting mantles into strips or pieces as desired. Cut tentacles into 1 - inch pieces.*

*Sprinkle lemon juice, salt and pepper on squid. Combine milk and egg. Dip squid in milk and roll in flour. Place squid in a single layer in hot oil, in a 10 - inch fry pan. Fry at a moderate heat, 350°F, for 3 to 5 minutes. Turn carefully. Fry 3 to 5 minutes longer or until squid are lightly browned. Drain on absorbent paper. Serve with lemon wedges. Makes 3 to 4 servings.*

### SQUID WITH TOMATOES & WINE (Italian Style)

2 Pounds whole squid, fresh or frozen  
 1/4 cup olive oil  
 1 cup chopped onion  
 1 cup canned tomatoes  
 1/4 cup sherry  
 1/2 tsp. salt  
 1/4 tsp. oregano  
 1/4 tsp. dried parsley  
 1/8 tsp. crushed red peppers  
 Dash white pepper  
 1 package (8 oz.) spaghetti  
 1 T. chopped parsley

*Clean squid, leaving washed mantles intact. Cut mantles into 1/2 - inch rings. Wash and drain thoroughly on absorbent paper. Cut tentacles into 1 - inch pieces.*

*Cook onion in hot oil until tender. Add squid and cook for approximately 5 minutes. Add tomatoes, sherry and seasonings. Cover and simmer for 1 1/2 hours, stirring occasionally.*

*Cook spaghetti according to directions on package. Serve over spaghetti. Sprinkle with parsley. Makes 3 to 4 servings.*



item from catch through sale.

Lacking large freezer-processor ships, U. S. fishermen, Virginians included, have begun to take part in what are termed "joint ventures" with foreign fishing companies.

A joint venture is a formal agreement between fishermen of one country and processor/marketers of another, with government approval, to cooperate in exploiting a fishery. Joint ventures for squid within America's 200-mile fisheries conservation zone usually involve trawlers of U. S. registry supplying fresh squid to a foreign-registered freezer-processor ship. There are advantages for both sides.

A foreign country can fill its allotted quota of squid within the 200-mile limit by direct harvest. Then, through a joint venture agreement with an American fishing concern, the foreign vessel cannot continue to fish, but can continue to take on squid purchased from American "catcher" boats. The American vessels, lacking processing and freezing capabilities, can continue to fish, simply trading full trawl cod ends for empty ones with the processor ship.

In this way the American vessels can stay on the fishing grounds until fuel and supplies run low, then make "one more haul," or as many as the boat can handle, and return to port with a load to be marketed domestically.

As Jim Zaborski, General Manager of Newport News Seafood Industrial Park said in an interview, "Joint ventures are the surest way for Americans fishing squid to get a guaranteed price for their product. Everybody comes out ahead. Our ships don't have a fuel and marketing problem, and the foreign vessel can just sit out there and load, process and store squid to capacity, adhering to its own quality standards."

Zaborski and other members of the Department of Development of the City of Newport

News are currently involved in a squid project funded by the Mid Atlantic Fisheries Development Foundation.

Scheduled to begin in September 1983, the project will attempt to identify and secure markets for squid landed at shoreside East Coast facilities. Further, the investigators will identify problems associated with marketing squid destined for human consumption, and will assess processing equipment available to produce squid products in various forms, such as rings, tubes and strips.

In 1982, Zaborski related, a lot of squid landed in Virginia was sold to the Canadian market because Canada's domestic catch was lower than anticipated. The Canadians, in turn, sold the squid as bait to longliners.

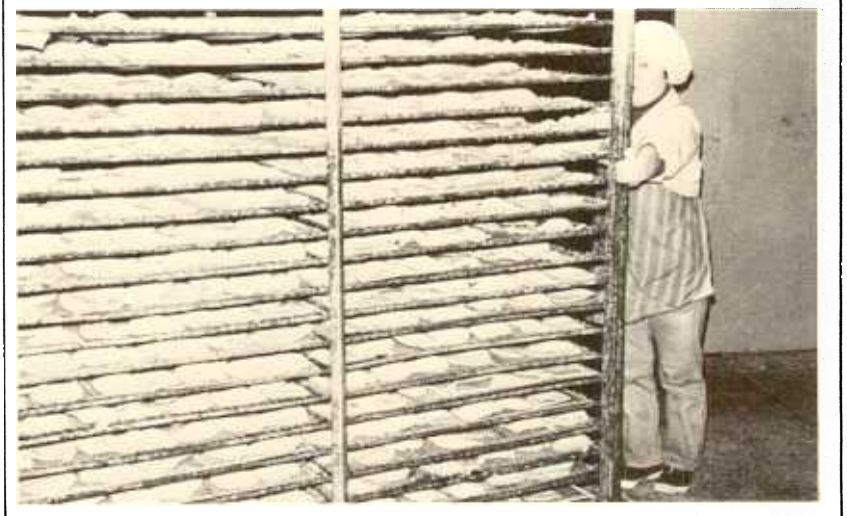
Richard Denzler, Fisheries Reporting Specialist with the National Marine Fisheries Service (NMFS) Office in Hampton, Virginia, pointed out the differences in squid landings at Hampton Roads in just two seasons. Hampton Roads is by far the major port for Virginia's ocean seafood products.

Denzler said the preliminary NMFS figures for the 1982 season, released in February 1983, show a great increase in squid landings over the 1981 season: There were no landings of *Illex* in 1981, compared to 2,457,000 pounds thus far in the 1982 season (ends in spring 1983). Landings for *Loligo* were 336,700 pounds in 1981; 787,000 through mid-February in 1983.

A joint venture by Fass Brothers Seafood of Hampton, Virginia, accounted for 2208 MT of *Illex* and 1094 MT of *Loligo* in 1982 according to Denzler, who added: "There definitely is a potential for developing a squid market in Virginia."

I. Luie Fass discussed the joint venture his company was involved in last year. Fass Brothers Seafood, Inc., the largest seafood firm in Virginia in 1982, acquired a 160' catcher-processor named

*A drying rack filled with squid. Processed in this way or by sun-drying, squid is a popular snack food in Japan and parts of Europe. American consumers will see an increasing number of squid products in the future as promotional efforts materialize.*



NMFS Photo

the *Holland* from a foreign firm, then converted it entirely to processing. The *Holland* bought nearly 2 million pounds of summer squid on the mid Atlantic fishing grounds from approximately five American trawlers.

Once frozen, most of the squid were sold to an Italian firm for human consumption. A lesser quantity was purchased by Japanese tuna longliners for bait.

Fass said the company will again be involved in catching, processing and marketing squid this year. He sees a great potential for squid in the domestic seafood market, especially when cut into rings, strips, etc. and breaded. He adds that it will need aggressive promotion, being a new item to most American palates.

John Holt of Mid Atlantic Seafood, mentioned earlier, had a few boats fishing for Fass Brothers last year. Mid Atlantic Seafood has a joint venture going forward this year, with Portuguese vessels doing the processing, Holt says. However, the total allowable joint venture tonnage hadn't been set by Washington as of late March, so all joint venture plans, based on 17,000 MT for the mid Atlantic, are "holding." Applications pending involve processing vessels from Spain, Portugal, Japan and Italy.

Holt has a very positive outlook for 1983, and anticipates use of both a freezer boat and land plant squid processing operation. He is currently attempting to get machinery for cleaning and ringing squid, anticipating a growing market for processed products.

Bill Carroll, Project Director for the Mid Atlantic Fisheries Development Foundation, also sees cause for optimism on the part of prospective East Coast squid fishermen. Carroll thinks joint ventures are the way to go at this stage of the fishery, at least until American consumers start accepting squid products on a wider basis.

"Right now our current domestic squid market consists almost entirely of bait for longliners, with a lesser portion going to ethnic restaurants in large metropolitan areas," Carroll said recently. And on joint ventures:

"Fishermen from Virginia can best enter into a joint venture by getting together, forming a corporation, then go looking for a foreign partner that needs squid."

European countries favor both *Loligo* and *Illex* over other species, says Carroll, but they demand a high quality product. Like the Japanese, Europeans like to see some "bloom" or body color in their squid: It indicates the degree of freshness.

Again, it comes back to onboard freezing, or at least icing in seawater with later freezing, if color is to be preserved.

Indicative of a growing U. S. acceptance of squid, as hoped for by resource managers and fishermen alike, is the increasing consumption of breaded rings and other squid products in Red Lobster Inns of America. According to Chris Muenzmay, Vice President in Charge of Purchasing and Distribution for the 351 Red Lobster Inns nationwide, squid is a popular appetizer item.

"We buy it in California," Muenzmay said. "We've been using it for about six months -- I won't say how much, but it is a substantial quantity -- and we haven't found an Inn where the fried rings aren't well accepted."

Muenzmay added that Red Lobster Inns has successfully marketed chopped, deep-fried mantle and tentacle products in California, and expanded use of squid is anticipated this year.

Short of seeking out a restaurant known to serve squid, Virginians may have a little trouble finding this seafood. The commercial processors aren't set up to welcome any through-the-door trade with individuals looking for a few pounds of squid. When those boats come in, the scene at a shoreside processing plant is one of barely contained pandemonium, where speed is of the essence. The processors like Fass and Holt say the best way to get fresh or frozen squid for the table is to persistently ask for it at the local seafood retailer.

This issue of the *Marine Resources Bulletin* contains some excellent recipes for this highly nutritious, reasonably priced seafood. Simply turn to our "FISH HOUSE KITCHEN" page.

Squid is easier to prepare for cooking than most fish, once you learn the proper method. Some of the reference literature listed at the end of this article can show you how.

A cooking study conducted by Rutgers University food technologists indicates that the method of cooking squid affects the texture dramatically. The experts say that squid should be cooked very quickly, either by frying or sauteeing for 2-3 minutes, or simmered in stews and sauces for greater than 16 minutes for optimum textural properties. Also, some people prefer to tenderize the cleaned mantles before cutting them into strips or rings.

In any event, it is likely that Americans will be seeing more squid and hearing more about squid in the coming year, and it looks like some of our commercial fishermen are going to be right there on top of the new wave.

Dick Cook



## More on Squid

*Proceedings of the International Squid Symposium*, August 9-12, 1981. Prepared by the New England Fisheries Development Foundation, Inc., 253 Northern Ave. Boston, MA 02210. 400 pages. Available at \$33.50 per copy from UNIPUB, P. O. Box 433, Murray Hill Station, New York, NY 10016.

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## Marine Resource Bulletin

A Sea Grant Advisory Service

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## Cover Note

The longfinned squid, *Loligo pealeii*, is frequently taken as a bycatch by Virginia's offshore trawlers during winter. With the growing interest in squid as an American seafood, plus foreign demand, squid is likely to become a seasonal target species for East Coast fishermen. Photo by John Arnold.

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